

A SABOT FOR REDUCING THE PARASITIC WEIGHT OF A KINETIC ENERGY PROJECTILE

Abstract

An energetic sabot allows part of the sabot to burn away at a controlled rate, adding propellant energy to the gun while at the same time completely support the projectile rod. The energetic sabot is thicker or larger at shot start to support the projectile without breaking. As the energetic sabot travels up the gun tube, the energetic sabot then thins out or otherwise decreases in mass as the force on the energetic sabot decreases. The weight of the projectile consequently decreases as it travels up the gun tube, allowing the gun gases to push a lighter projectile, giving the projectile a higher velocity. Due to its continually decreasing weight in the gun tube, the projectile experiences greater acceleration and exits the gun with a higher muzzle velocity. A secondary effect comes from increased pressure in the gun tube from the gases relinquished in the burning of the sabot, further increasing the velocity of the projectile. This higher velocity in turn leads to greater projectile velocity at target impact, and thus a greater penetration

depth. The energetic sabot is "doped" with energetic materials by sprinkling either explosive, propulsive, or pyrotechnic agents between layers of the composite material in the energetic sabot.

These agents ignite upon propulsion; their composition is determined from their burn rates. The burn rate may be designed proportional to the decrease in chamber pressure; the less pressure in the tube, the more material that can be relinquished.